

## CLAIMS:

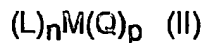
1. A method for the production of an olefin polymer, which method comprises polymerising an olefin monomer in the presence of a catalyst component selected

either from a complex of formula (I):



wherein Cp is a substituted or unsubstituted cyclopentadienyl or fluorenyl ring; R'' is a structural bridge between Cp and X imparting stereorigidity to the component; each R is the same or different and is selected from a hydrocarbyl group having from 1-20 carbon atoms, a halogen, an alkoxy group, an alkoxyalkyl group, an alkylamino group or an alkylsilylo group; q is an integer from 0-8; X is a heteroatom from group 15 or 16 of the Periodic Table; M is a metal atom from group 4 of the Periodic Table ; R' is hydrogen or a hydrocarbyl having from 1 to 20 carbon atoms and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen;

or from a complex of formula (II):



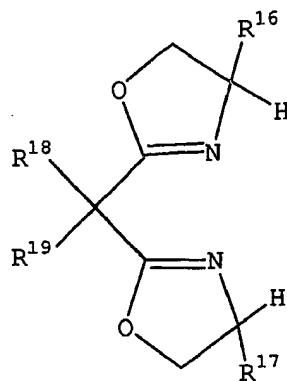
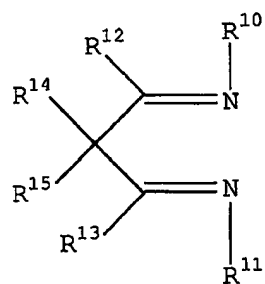
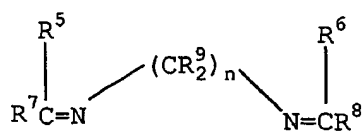
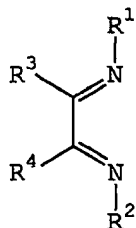
wherein L is an heteroatom-containing ligand; n is an integer of 1, 2, or 3; M is selected from Ti, Zr, Sc, V, Cr, Fe, Co, Ni, Pd, or a lanthanide metal; each Q is independently a hydrocarbon having 1-20 carbon atoms or a halogen; and p is the valence of M minus the sum of the coordination numbers of all L;

characterised in that the catalyst component comprises one or more alkyl moieties having a terminal olefin group, and wherein the alkyl moiety having a

terminal olefin group is a substituent on R", Cp and/or X in the complex of formula I or is a substituent on L, and/or Q in the complex of formula II.

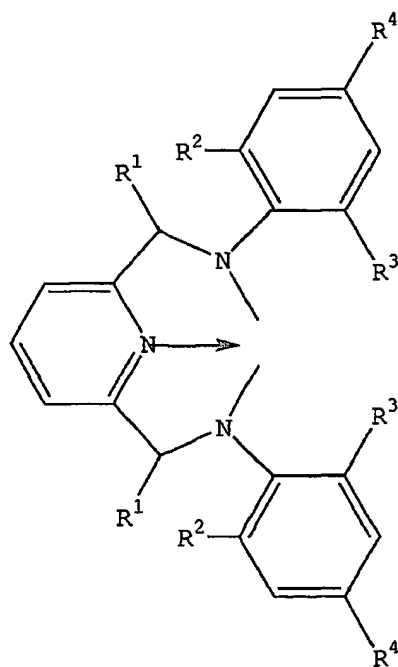
2. A method according to claim 1, wherein Cp in formula (I) is a cyclopentadienyl ring and at least one group R in formula (I) is positioned on the Cp ring such that it is distal to the bridge R", which group R comprises a bulky group of the formula  $ZR^*_3$  in which Z is an atom from group 14 of the Periodic Table and each R\* is the same or different and is chosen from a hydrogen or a hydrocarbyl group having from 1-20 carbon atoms.
3. A method according to claim 2, wherein  $ZR^*_3$  is selected from  $C(CH_3)_3$ ,  $C(CH_3)_2Ph$ ,  $CPh_3$ , and  $Si(CH_3)_3$ .
4. A method according to any preceding claim, wherein X in formula (I) is N or P.
5. A method according to any preceding claim, wherein R" comprises an alkylidene group having 1 to 20 carbon atoms, a germanium group, a silicon group, a siloxane group, an alkyl phosphine group, or an amine group.
6. A method according to claim 5, wherein R" comprises a substituted or unsubstituted ethylenyl group, an isopropylidene ( $Me_2C$ ) group, a  $Ph_2C$  group, or a  $Me_2Si$  group.
7. A method according to any preceding claim, wherein M is Ti, Zr, or Hf.
8. A method according to any preceding claim, wherein Q is Cl or Me.

9. A method according to claim 1, wherein L in formula (II) is a bidentate ligand selected from:

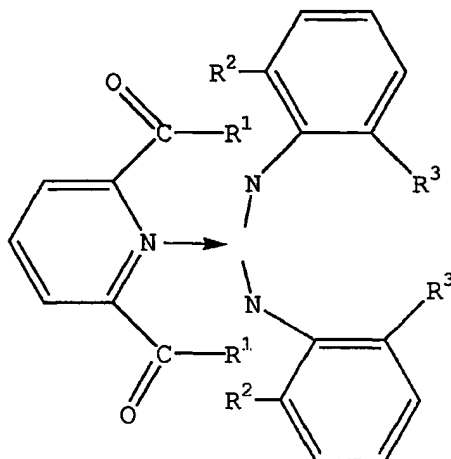


wherein  $n$  is an integer of 2 or 3;  $R^1$ ,  $R^2$ ,  $R^7$ ,  $R^8$ ,  $R^{10}$ ,  $R^{11}$ ,  $R^{12}$ ,  $R^{13}$ ,  $R^{16}$  and  $R^{17}$  are each independently a hydrocarbyl or a substituted hydrocarbyl group, and  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ ,  $R^9$ ,  $R^{14}$ ,  $R^{15}$ ,  $R^{18}$ , and  $R^{19}$  are each independently a hydrogen, hydrocarbyl or substituted hydrocarbyl group; and wherein one or more of the following when taken together may form a ring:  $R^3$  and  $R^4$ , both of  $R^9$ ,  $R^5$  and  $R^7$ ,  $R^6$  and  $R^8$ ,  $R^{18}$  and  $R^{19}$ .

10. A method according to claim 1, wherein  $L$  in formula (II) is a tridentate ligand, having the following formula:



or three monodentate ligands having the following arrangement:



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are each independently a hydrogen, hydrocarbyl or substituted hydrocarbyl group.

11. A method according to claim 9 or claim 10, wherein M is selected from Fe and Co.

12. A method according to any preceding claim, wherein the olefin monomer comprises ethylene or propylene.

13. A method according to any preceding claim, wherein the alkyl moiety having a terminal olefin group comprises a substituted or unsubstituted alkyl group having from 2-20 carbon atoms.

14. A method according to claim 13, wherein the alkyl moiety having a terminal olefin group comprises a  $\omega$ -ethylenyl,  $\omega$ -propylenyl,  $\omega$ -butylenyl,  $\omega$ -pentylenyl,  $\omega$ -hexylenyl,  $\omega$ -heptylenyl,  $\omega$ -octylenyl,  $\omega$ -nonylenyl or a  $\omega$ -decylenyl group.

15. An olefin polymer, obtainable according to a method as defined in any of claims 1-14.

16. A metallocene catalyst as defined in any of claims 1-14.
17. Use of a metallocene catalyst for producing an olefin polymer, which catalyst is a catalyst as defined in claim 16.
18. Use according to claim 17, wherein the olefin polymer is an ethylene polymer or a propylene polymer.